

The evolution of technology has brought the need to communicate everywhere and at all times without being confined to one space. Our internal wireless device antennas feature wide bandwidth to enhance the performance and application of portable wireless devices based on standards such as 802.11 and Bluetooth®. The antennas are specifically designed to be embedded inside devices for aesthetically pleasing integration with high durability.

Features and Benefits

- Covers 2.4 to 2.5 GHz and 4.9 to 6 GHz for all WLAN applications
- Coaxial cable pigtail with various connector choices
- Omnidirectional patterns and all frequencies with increased gain in upper bands for optimal coverage
- Conformance to European RoHS Directive

Specifications						
Part Numbers	CAF94505, MAF95090, MAF94158			ENB2449A1-10MHL4, ENB2449A1-20UFL		
Operating Frequency (MHz)	2400-2500	5150-5350	5600-6000	2400-2500	5150-5350	5600-6000
Peak Gain – Max (dBi)	2	3.9	4	3.19	4.1	4.35
VSWR – Max	2:1					
Nominal Impedance (Ohms)	50					
Polarization	Vertical, Omnidirectional					
Dimensions – cm (in.)	4.95 x 1.64 x .152 (1.94 x 0.65 x.06)					
Material Substance Compliance	RoHS					
Operating Temperature – ˚C (˚F)	-30 to +70 (-22 to +158)					
Storage Temperature – ˚C (˚F)	-40 to +85 (-40 to +185)					

1 Configuration

Part Number	Cable Length	Connector
CAF94505	100 mm, Ø 1.13 mm	IPEX MHF
MAF95090	175 mm, Ø 1.13 mm	IPEX MHF
MAF94158	279.4 mm, Ø 1.13 mm	IPEX MHF
ENB2449A1-10MH4L	100 mm, Ø 1.13 mm	IPEX MHF4L
ENB2449A1-20UFL	200 mm, Ø 1.13 mm	IPEX MHF

Note: Specifications are based on the 100mm cable length, standard antenna version with MHF1 / U.FL connector. Varying the cable length or type or connector will cause variations in these antenna specifications.

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2 Flat Surface Antenna Measurements

Flat surface measurements were performed with the antenna in free space.

2.1 VSWR

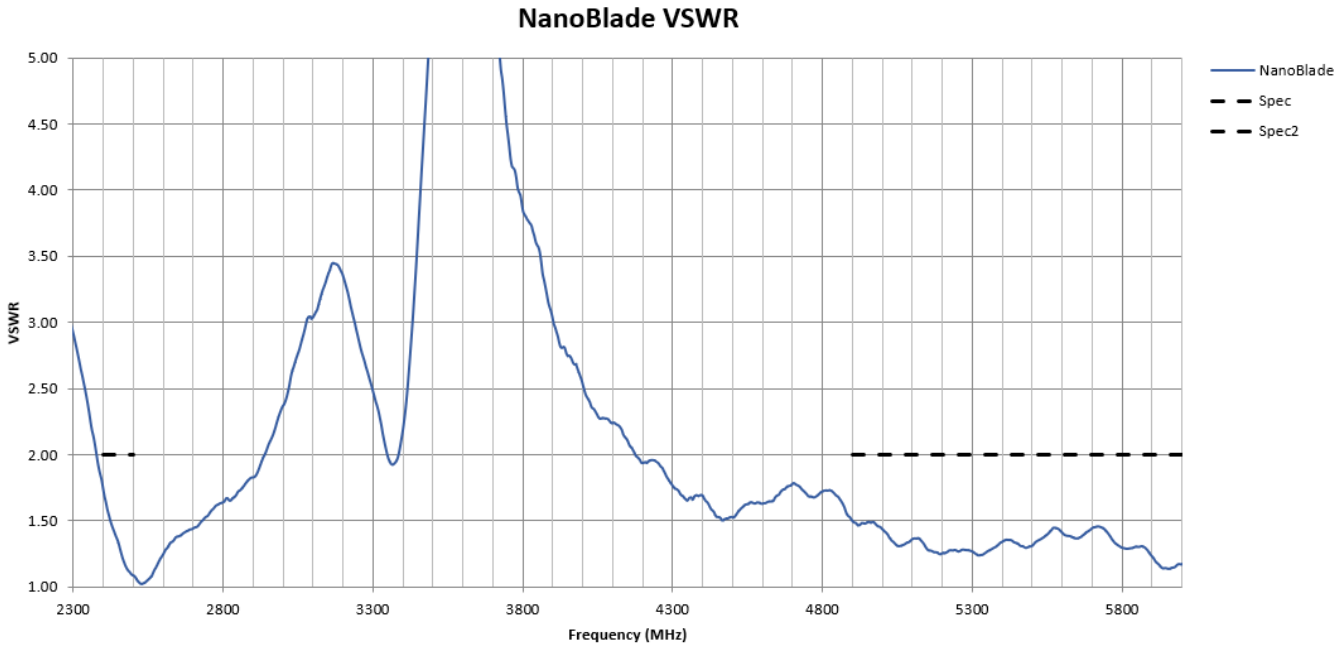


Figure 1: Antenna VSWR measured in free space

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2.2 RETURN LOSS

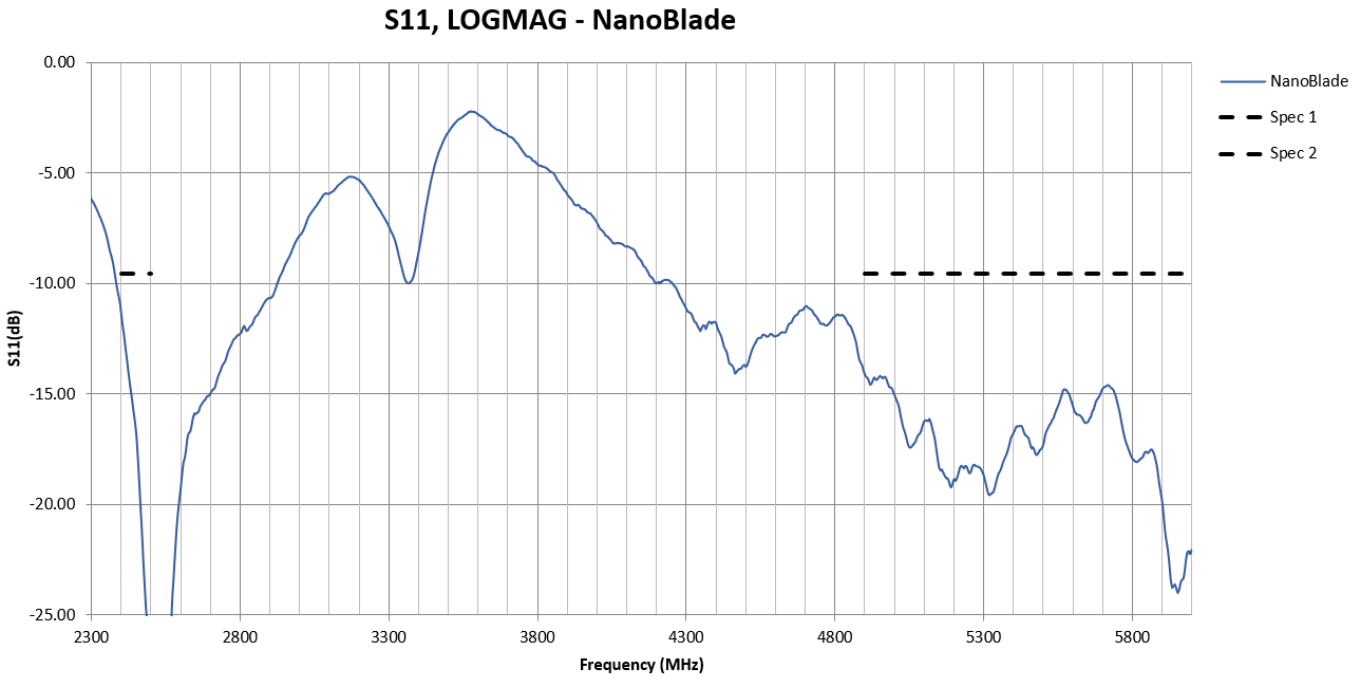


Figure 2: Antenna Return Loss measured in free space

3 Antenna Chamber Test Setup

Antenna measurements such as VSWR and S11 were measured with an Agilent E5071C vector network analyzer. Radiation patterns were measured with a Rohde & Schwarz ZNB8-4PORT vector network analyzer in a Howland Company 3100 chamber equivalent. Phase center is nine inches above the Phi positioner.

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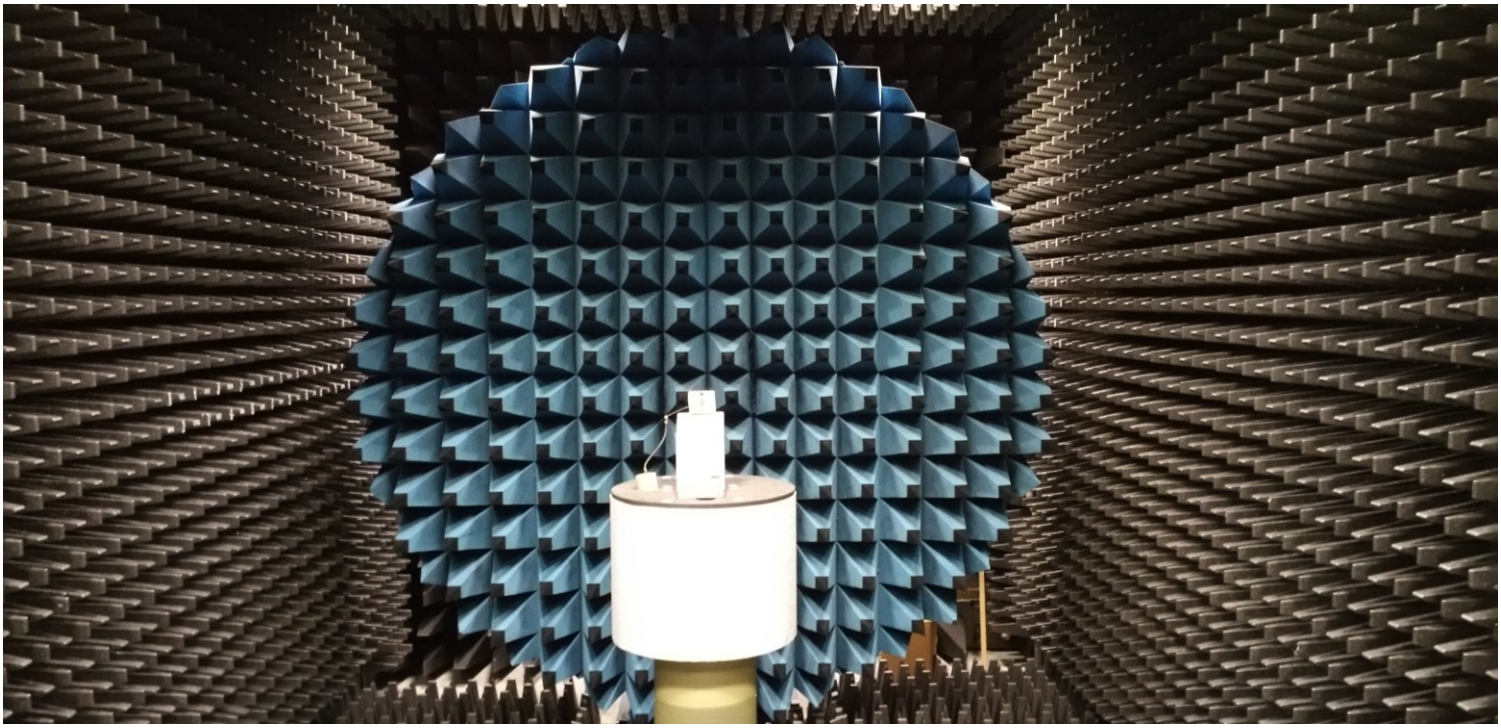


Figure 3: Howland Company 3100 Antenna chamber

4 Antenna Radiation Performance

4.1 Nanoblade centered in free space

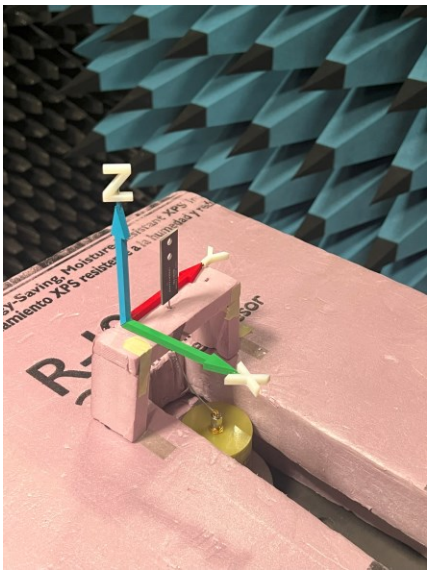
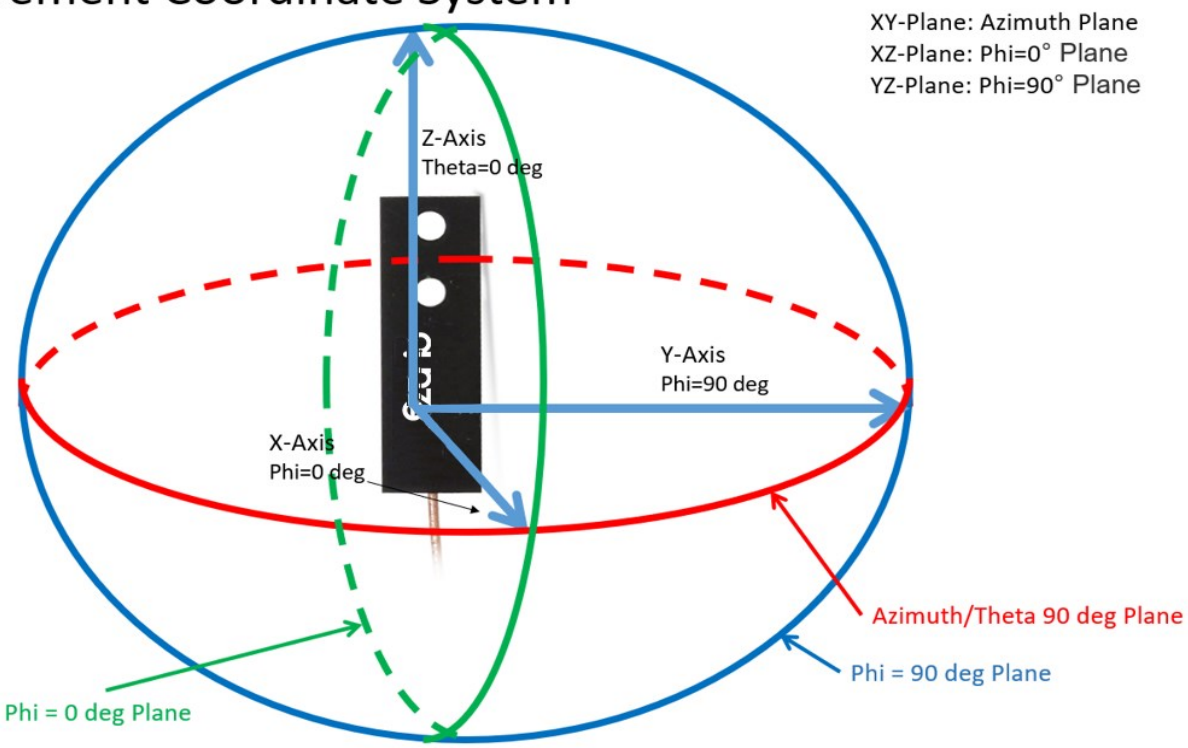


Figure 4: Flat surface setup

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3D Measurement Coordinate System

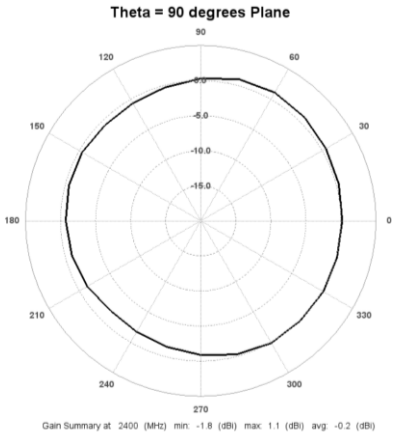


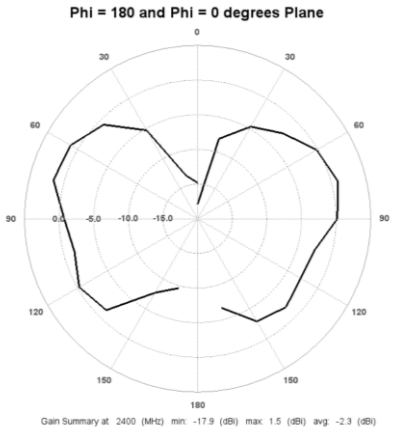
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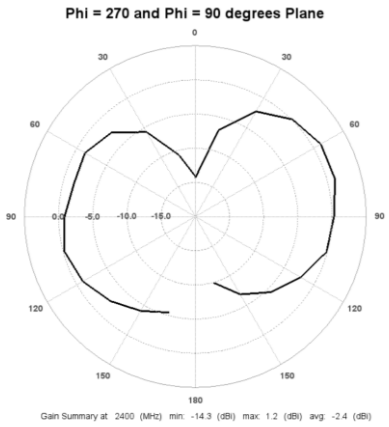
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4.2 RADIATION PATTERNS – 2D Plots

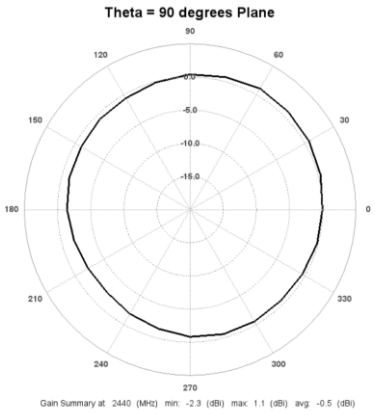
4.2.1 2D Plots at 2400 MHz

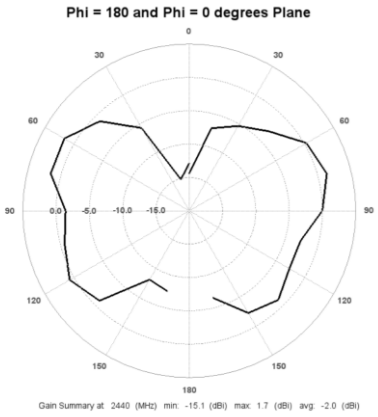


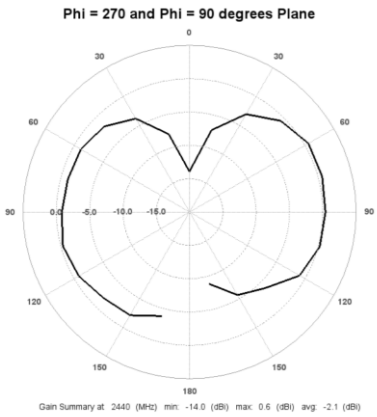




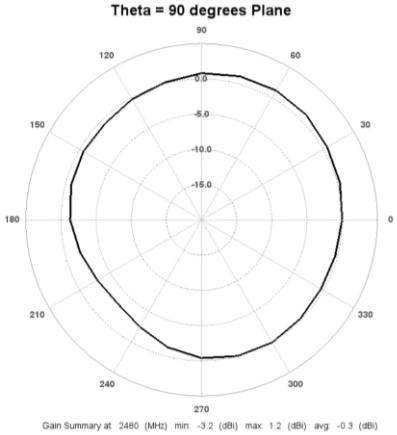
4.2.2 2D Plots at 2440 MHz

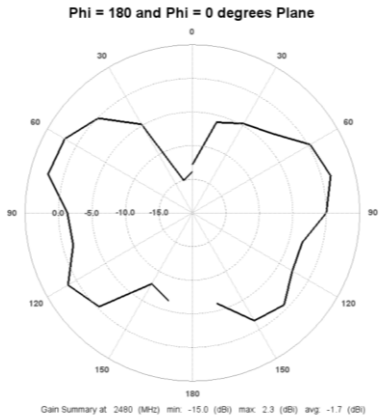


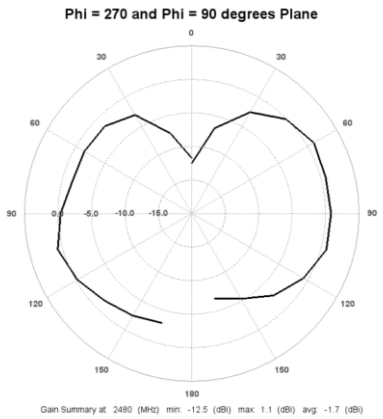




4.2.3 2D Plots at 2480 MHz



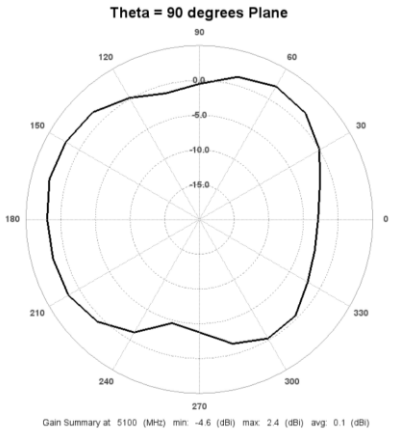


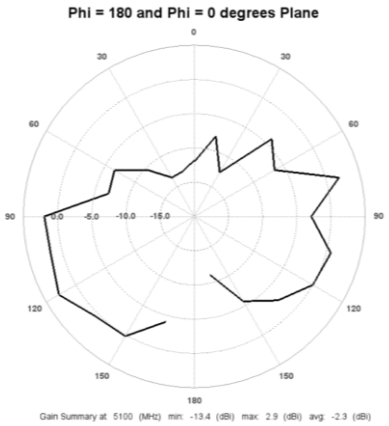


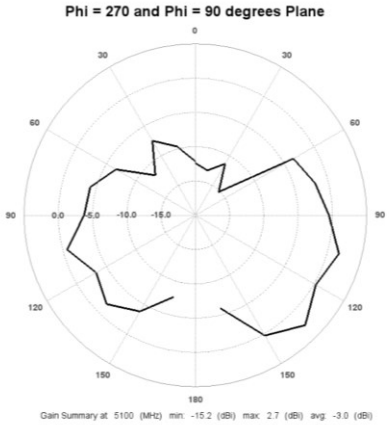
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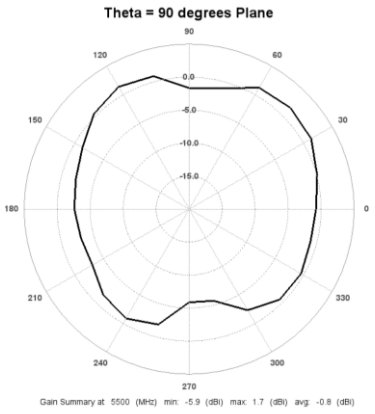
4.2.4 2D Plots at 5100 MHz

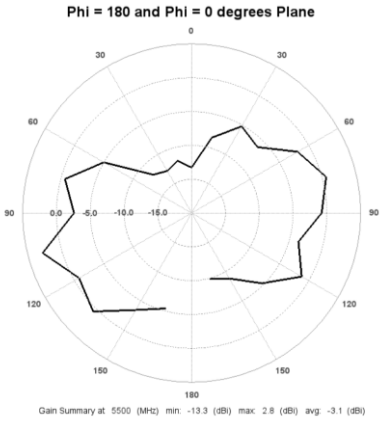


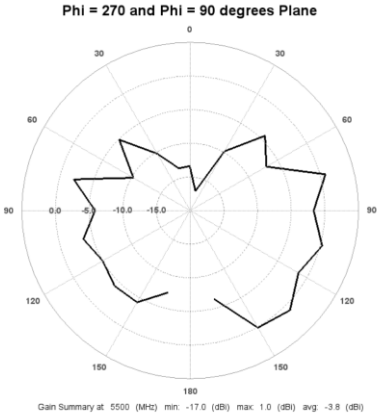




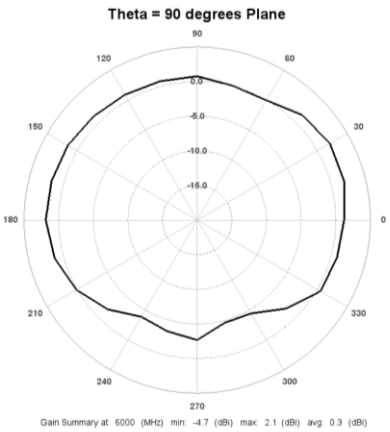
4.2.5 2D Plots at 5500 MHz

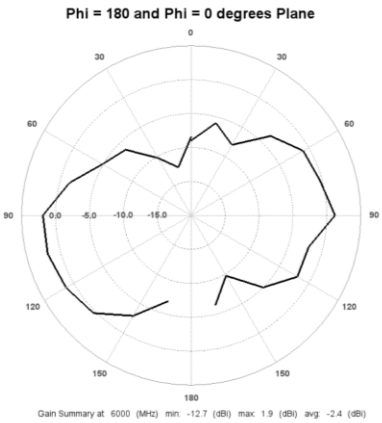


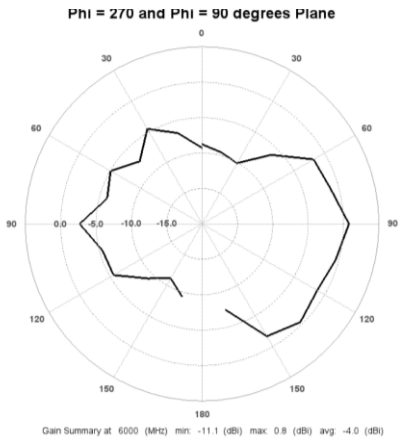




4.2.6 2D Plots at 6000 MHz







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4.3 RADIATION PATTERNS – 3D Plots

4.3.1 3D Plots at 2400 MHz

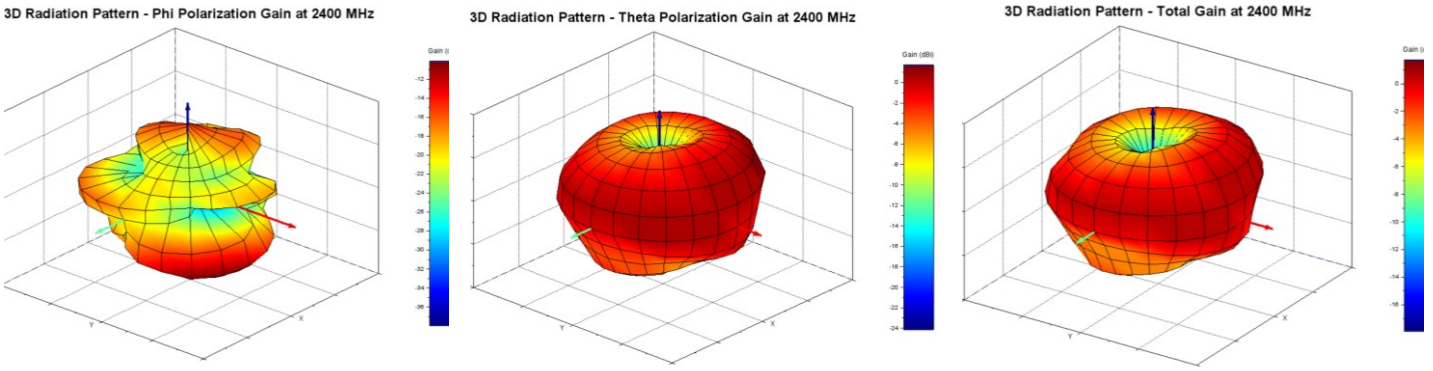


Figure 5: Phi polarization, Theta polarization and, and total gain plots – 2400 MHz

4.3.2 3D Plots at 2440 MHz

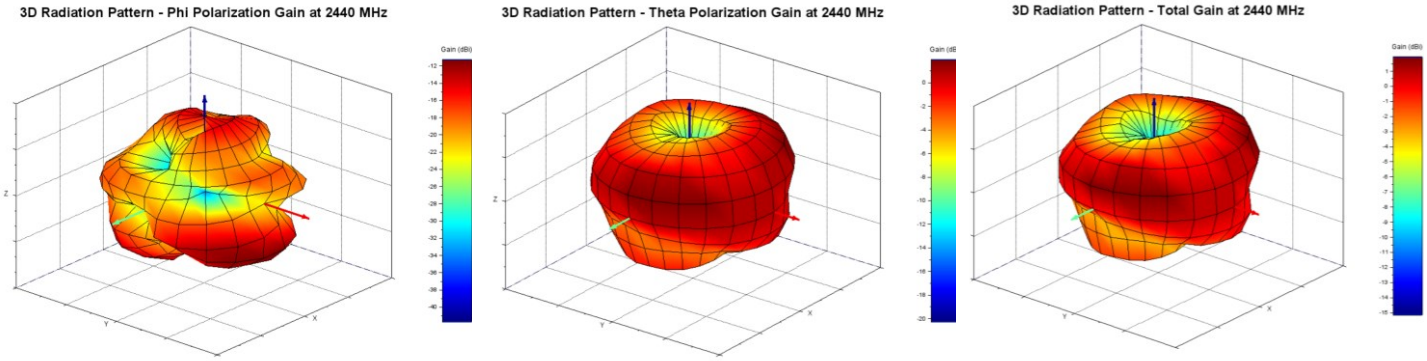


Figure 6: Phi polarization, Theta polarization and, and total gain plots – 2440 MHz

4.3.3 3D Plots at 2480 MHz

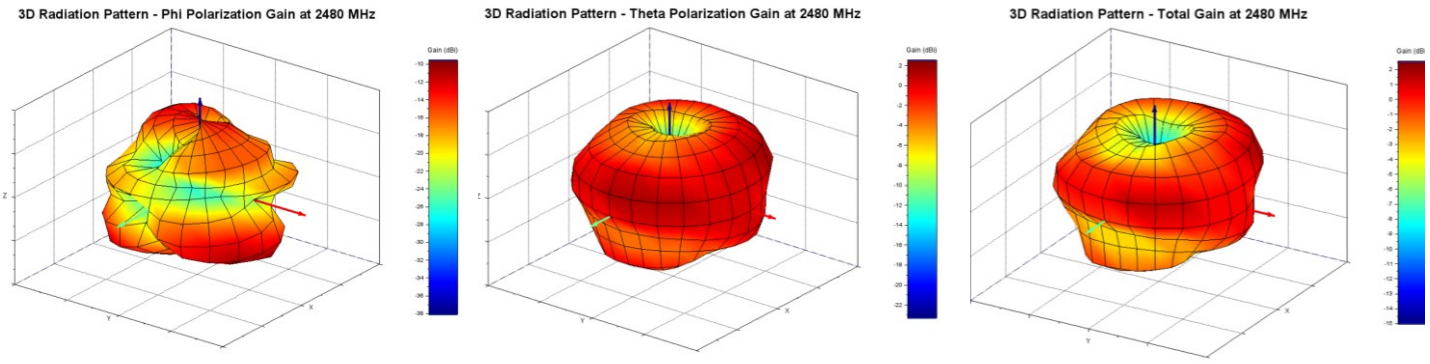


Figure 7: Phi polarization, Theta polarization and, and total gain plots – 2480 MHz

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4.3.4 3D Plots at 5100 MHz

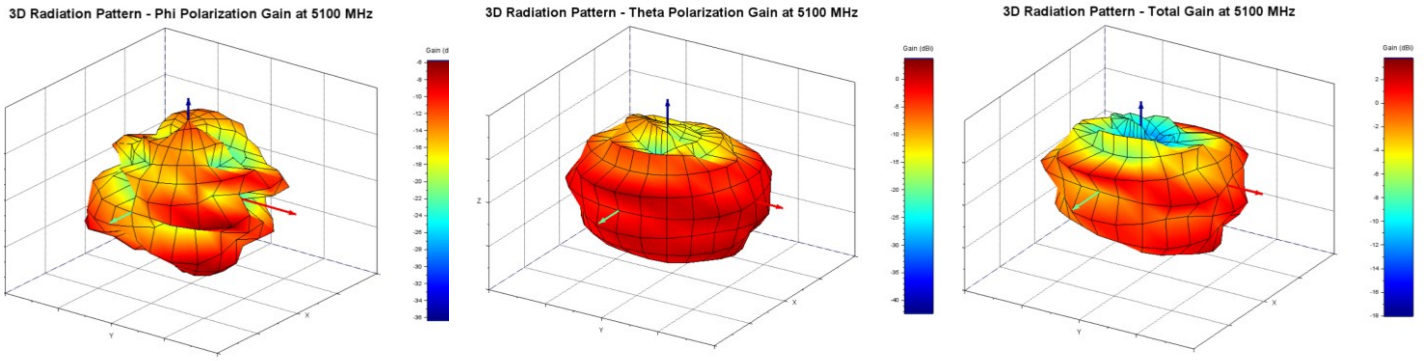


Figure 8: Phi polarization, Theta polarization and, and total gain plots – 5100 MHz

4.3.5 3D Plots at 5500 MHz

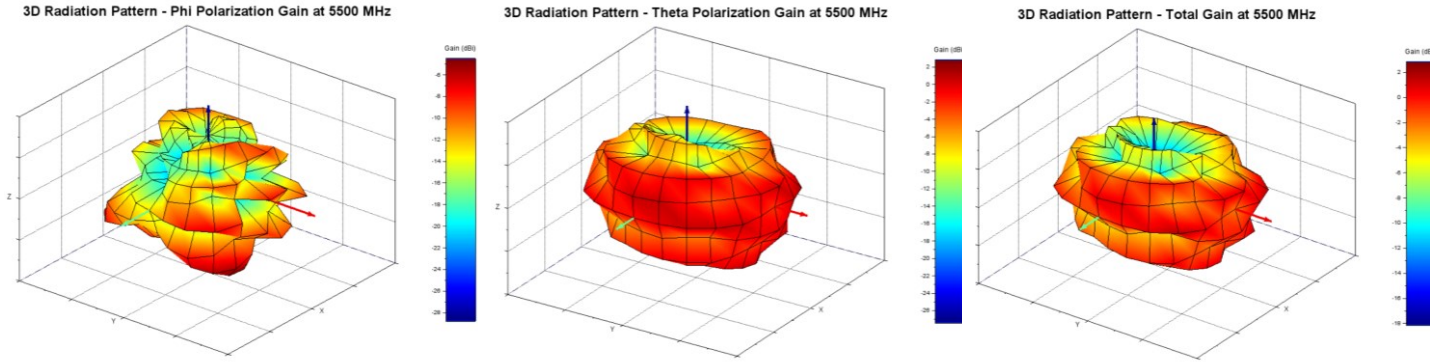


Figure 9: Phi polarization, Theta polarization and, and total gain plots – 5500 MHz

4.3.6 3D Plots at 6000 MHz

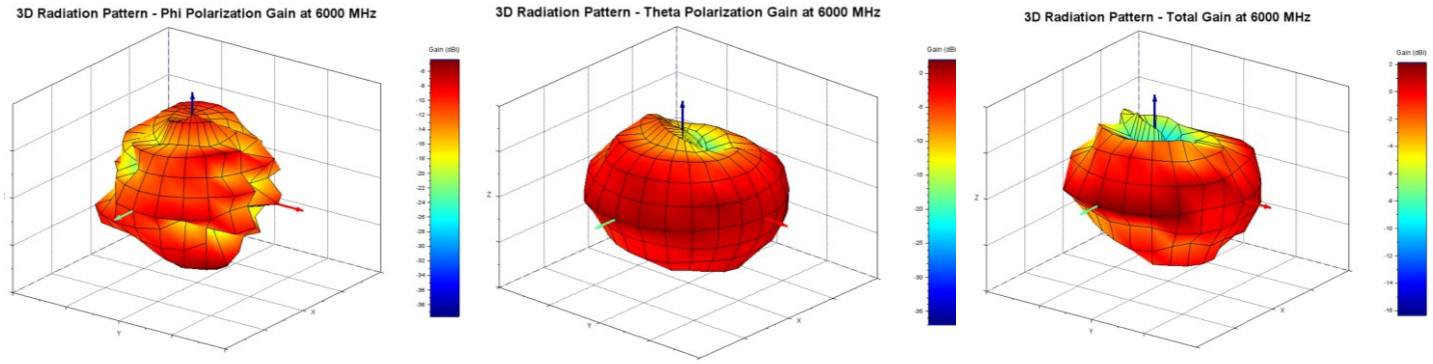


Figure 10: Phi polarization, Theta polarization and, and total gain plots – 6000 MHz

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4.4 EFFICIENCY

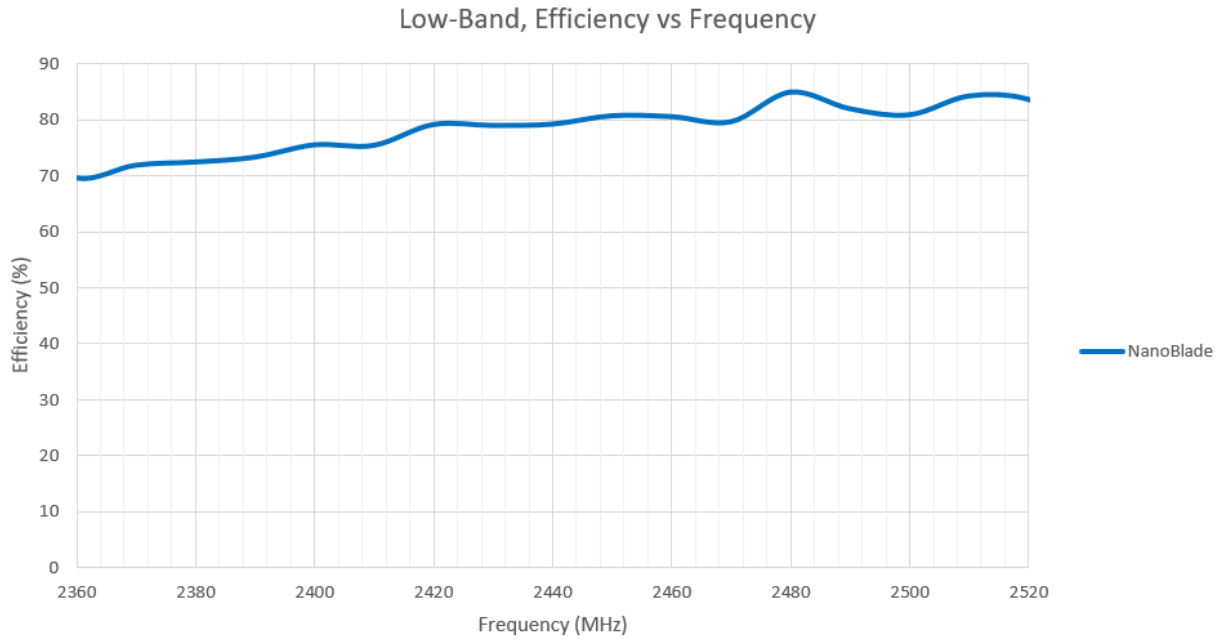


Figure 11: Low-Band antenna efficiency measured in free space with a nominal value of -1.1dB across the operating frequency

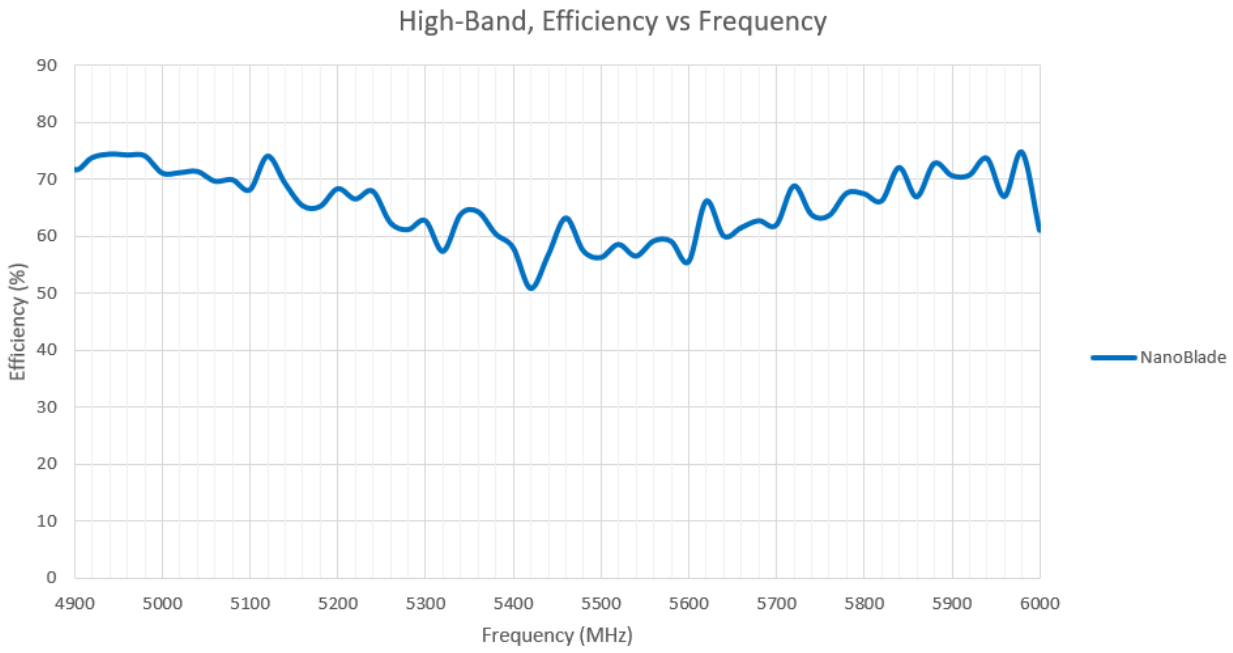


Figure 12: High-Band antenna efficiency measured in free space with a nominal value of -1.91dB across the operating frequency

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4.5 ANTENNA GAIN

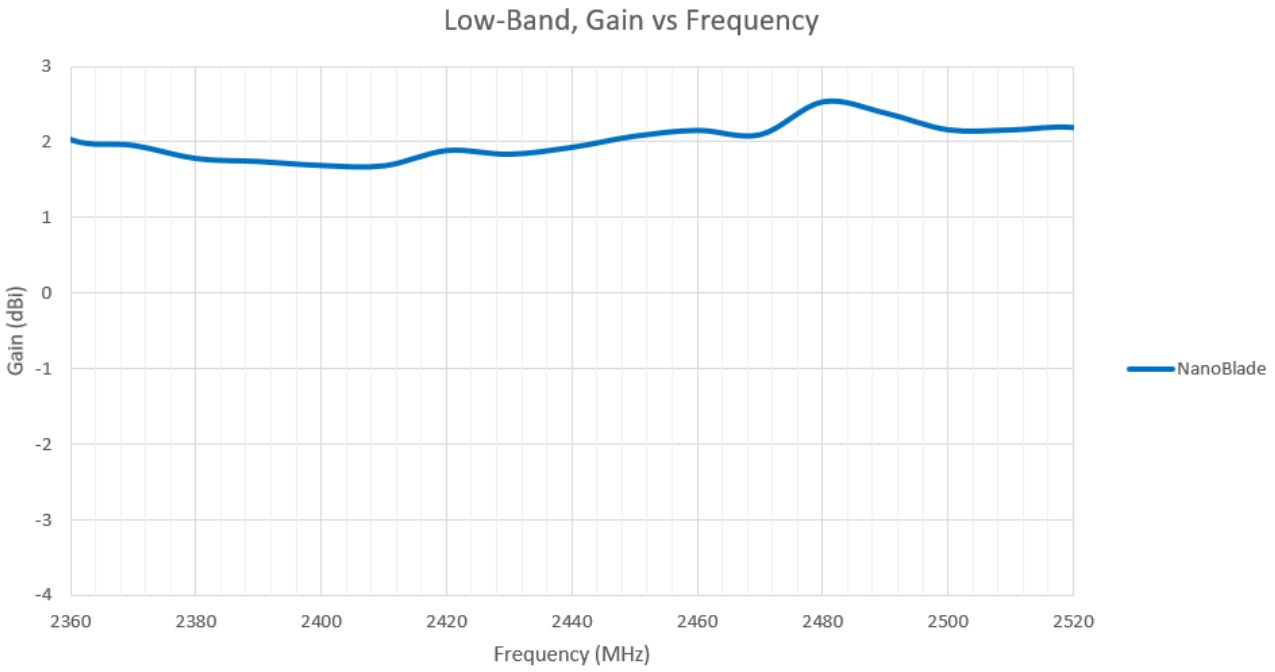


Figure 13: Low-Band Total Gain vs. Frequency, measured in free space

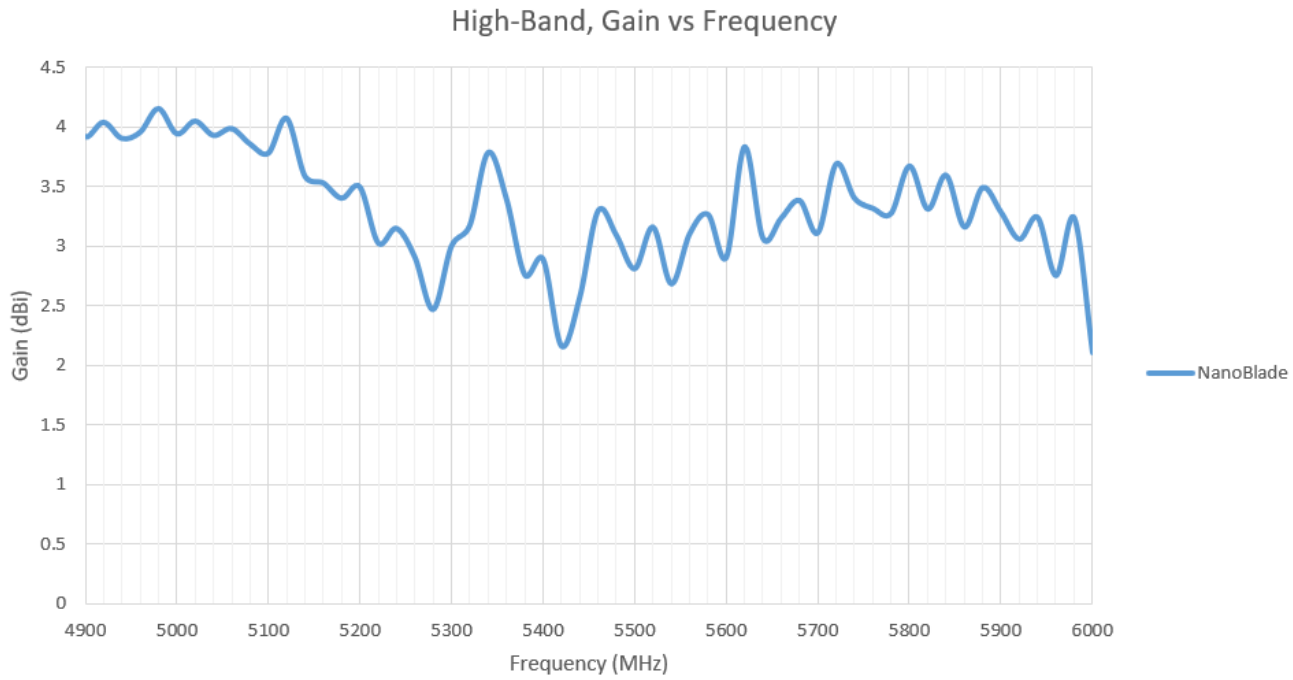
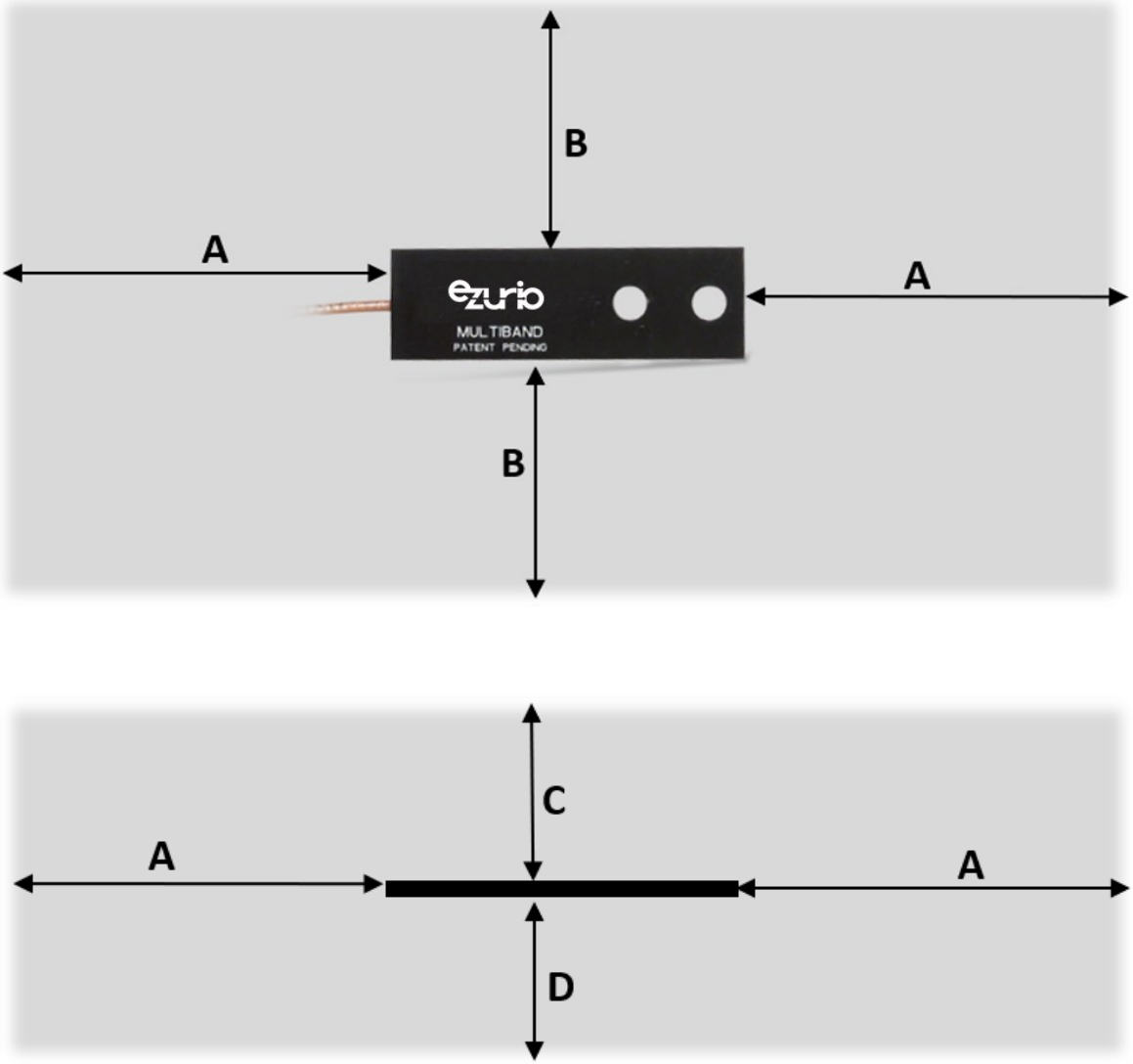


Figure 14: High-Band Total Gain vs. Frequency, measured in free space

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5 Recommended Antenna Conductive Material Keep Out Region



Keep Out Region Distance (mm)			
A	B	C	D
5	5	10	10

Notes:

- Antenna can be mounted on polycarbonate with a nominal thickness of 2.25mm (1.5mm - 3mm), or with plastic screws
- Diagram is not to scale

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